



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/263,068	03/08/1999	BORIS PECHENY	50277-164	1360

7590 11/23/2001
DITTHAVONG & CARLSON, P.C.
10507 BRADDOCK RD
SUITE A
FAIRFAX,, VA 22032

EXAMINER

FLEURANTIN, JEAN B

ART UNIT	PAPER NUMBER
----------	--------------

2153

DATE MAILED: 11/23/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/263,068

Applicant(s)

Boris Pecheny

Examiner

Jean Bolte Fleurantin

Art Unit

2172



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Sep 4, 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some* c) ☐ None of:

- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. _____.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 20) ☐ Other: _____

Art Unit: 2172

DETAILED ACTION

1. Claims 31-34 are added.

Claims 1-34 are remained for examination.

Response to Amendment

2. Applicant's arguments submitted on September 04, 2001 with respect to claims 1, 15-16, and 30-32 have been considered but are not persuasive.

Response to Applicant' Remarks

3. Applicant stated on page 11 that "identifying a lexical container from among a plurality of lexical containers based on a length of a key" or "identifying a hash table from among a plurality of hash tables based on a length of the key". This feature, however, is not disclosed in Li et al. However, Examiner disagrees because Li includes the step of comparing strings with entries of a lexicon by portioning representations of the entries of the lexicon into groups based on one or more characteristics of the entries indexing the entries based on one or more characteristics of the groups into an index comprising buckets mapped to the lexicon portioning a representation of an unverified string into groups based on the same characteristics used to partition the lexicon entries indexing the unverified string to the index based on the same characteristics used to index based on the same characteristics used index the lexicon entries into the index, and comparing the representation of the unverified string with representations of only lexicon entries that are commonly indexed to a selection of the buckets to which the unverified

Art Unit: 2172

string indexed; which is read as identifying a lexical container from among a plurality of lexical containers based on a length of a key, see col. 2, lines 51-64. And, also Li further teaches the step of the number of groups hashed to the bucket address table determines the size of the initial list of candidate entries for the unverified string; and candidate strings having a normalized edit distance above a threshold are discarded leaving only those candidate strings having a normalized edit distance below the threshold in the final list of candidates, the threshold may be set to limit the final list to a set number of candidates; which is read as “identifying a hash table from among a plurality of hash tables based on a length of the key”, see cols. 9 and 10, lines 5-9 and 4-9.

Applicant stated on page 12 that Li et al. does not disclose a method in which a lexical container or hash table from among a plurality of lexicon based on “a length of the key”. Thus, Examiner disagrees because Li includes the step of determining a set of group numerical values one for each group of the signature vector of an entry based on the group’s list bit values establishing a bucket for each group of the signature vector having a bucket address equal to the group numerical value, and mapping the entry into all the buckets having a bucket address equal to one of the group numerical values; which is read as a length of the key; see col. 3, lines 8-15.

Examiner is entitled to give claim limitations their broadest reasonable interpretation in light of the specification.

Interpretation of Claims-Broadest Reasonable Interpretation

Art Unit: 2172

During patent examination, the pending claims must be 'given the broadest reasonable interpretation consistent with the specification.' Applicant always has the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 162 USPQ 541,550-51 (CCPA 1969).

Claim Rejections - 35 U.S.C. § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(e) that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-4, 16-19, and 31-34 are rejected under U.S.C. 102(e) as being anticipated by Levine et al.(US Pat. No. 6,073,129).

As per claims 1, 16, and 31-32 Li teaches a method of searching for a string in a lexical cache, as claimed comprises the computer implemented steps of generating a key based on the string (thus, this string is assumed to be the 45th entry in the lexicon, which is equivalent to generating a key based on the string) (see figure 5, col. 8, lines 28-31);

identifying a lexical container from among a plurality of lexical containers based on a length of the key (where, find a small subset of the lexicon which shares characteristics with the

Art Unit: 2172

unverified string, which is readable as identifying a lexical container from among a plurality of lexical containers based on a length of the key) (see cols. 8 and 9, lines 53-67 and 1-17);

searching the lexical container for an entry associated with the string (thus, the truth value of the unverified string will be found in the candidate list, which is readable as searching the lexical container for an entry associated with the string) (see col. 9, lines 28-31).

As per claims 2 and 17, Li teaches a method as claimed, wherein the step of generating a key based on the string includes the step of compressing the string to produce the key (thus, when the bi-gram vector is folded the bit ad will fall in the first eight bits so the first bit of the signature vector will be set to 1, which is readable as generating a key based on the string includes the step of compressing the string to produce the key) (see figure 5, col. 8, lines 28-37).

As per claims 3 and 18, Li teaches a method as claimed, wherein the step of compressing the string to produce the key includes the step of performing an n-gram compression on the string (thus, ngram encoding techniques have been applied to compare ngram vectors representing the unverified string and the individual dictionary, an nonpositional ngram vector is formed by considering each set of n adjacent characters in the string and assigning a zero or one to the bit of the vector corresponding to that character combination; which is readable as wherein the step of compressing the string to produce the key includes the step of performing an n-gram compression on the string) (see cols. 1 and 2, lines 64-67 and 1-3). Also, in column 14, lines 49 through 50, Li teaches folding said n-gram vector into a signature vector by combining multiple n-gram into bits.

Art Unit: 2172

As per claims 4 and 19, Li teaches a method as claimed, wherein the step of generating a key based on the string includes the step of using the string as the key (thus, when the bi-gram vector is folded the bit ad will fall in the first eight bits so the first bit of the signature vector will be set to 1, which is readable as generating a key based on the string includes the step of compressing the string to produce the key) (see figure 5, col. 8, lines 28-37).

As per claims 33 and 34, Li teaches a method as claimed, wherein a first lexical container of the lexical containers is associated with a first key length (thus, mapping the unverified string into at least the bucket having a bucket address equal to the group numerical value for the first group of the unverified string's signature vector; which is readable as wherein a first lexical container of the lexical containers is associated with a first key length) (see col. 3, lines 44-50); a second lexical container of the lexical containers is associated with a second key length (thus, a second portion of the lexicon comprising some of the entries of the first portion by directly comparing an encoded representation of the unverified string with encoded representations of the entries of the first portion of the lexicon; which is readable as a second lexical container of the lexical containers is associated with a second key length) (see col. 4, lines 28-32); the first key length is less than the second key length (thus, reducing lexicon size may generally be described as defining a first portion of the lexicon by selecting entries of the lexicon whose encoded representations share characteristics with an encoded representation of an unverified string; which is readable as the first key length is less than the second key length) (see col. 4, lines 24-28);

Art Unit: 2172

the first lexical container is configured to hold more entries than the second lexical container (thus, a second portion of the lexicon comprising some of the entries of the first portion by directly comparing an encoded representation of the unverified string with encoded representations of the entries of the first portion of the lexicon, which is readable as the first lexical container is configured to hold more entries than the second lexical container) (see col. 4, lines 29-33).

Claim Rejections - 35 U.S.C. § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-15, and 21-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over ^{Levine in} ~~Li~~ ^{view of} (US Pat. No. 5,774,588) ~~(Li)~~,

As per claims 6 and 21, Li substantially teaches a method as claimed, wherein the step of identifying a lexical container based on a length of the key includes the step of identifying a hash table based on the length of the key (thus, find a small subset of the lexicon which shares characteristics with the unverified string, which is readable as identifying a lexical container based on a length of the key includes the step of identifying a hash table based on the length of the key) (see cols. 8 and 9, lines 53-67 and 1-17);

Art Unit: 2172

the step of searching the lexical container for an entry associated with said string includes the steps of computing a hash value based on the key (thus, this string is assumed to be the 45th entry in the lexicon, which is readable as computing a hash value based on the key) (see figure 5, col. 8, lines 28-31). But, Li does not explicitly indicate the step of said hash table containing sequences of slots for holding entries associated with strings, each of said sequences of slots corresponding to a respective hash value; and searching the hash table based on the hash value for a slot holding an entry associated with said string. However, implicitly Li shows step of the same sequence of bigram occurs in the signature vector of every lexicon entry, prior to the static processing of the lexicon these signature vector bits may be ranked, counting the frequency occurs in the lexicon, the sorting process results in a bit frequency table; which is readable as sequences of slots for holding entries associated with strings, each of said sequences of slots corresponding to a respective hash value (see col. 7, lines 4-16). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Li with the step of said hash table containing sequences of slots for holding entries associated with strings, each of said sequences of slots corresponding to a respective hash value. This modification would allow the teachings of Li to provide an improved method and system for comparing an unverified string to the entries of a dictionary or lexicon which is computationally efficient and accurately limits the lexicon to a small number of candidates (see col. 4, lines 49-53).

Art Unit: 2172

As per claims 7 and 22, Li substantially teaches a method as claimed, wherein the step of computing a hash value based on the key includes the step of computing the hash value based on the key and a prime number associated with the hash table (thus, the lexicon is stored in a bucket associated with the bucket address equal to the decimal number of the group, which is readable as computing a hash value based on the key includes the step of computing the hash value based on the key and a prime number associated with the hash table) (see col. 8, lines 1-12).

As per claims 8 and 23, in addition to the discussion in claim 6, Li teaches a method as claimed, wherein the step of searching the hash table based on the hash value includes the steps of indexing one or more fixed regions of the hash table (see col. 2, lines 54-56).

As per claims 9 and 24, in addition to the discussion in claims 6 and 8, Li teaches all the subject matter of the claimed invention with the exception of an exact searching for the key in a linked list of slots stored in an expansion region of the hash table, if the key was not found in the one or more respective slots for the key. Thus, Li implicitly shows the step where ranked candidates for the unverified string and the size of the final list is adjustable, which is readable as searching for the key in a linked list of slots stored in an expansion region of the hash table (see abstract, lines 17-20, and col. 8, lines 17-19). Also, in column 14, lines 34 through 36, Li teaches the final candidate list includes only highly possible and ranked candidates for the unverified string, and size of the final list is adjustable.

As per claims 10 and 25, the limitations of claims 10 and 25 are rejected in the analysis of claim 6 above, and these claims are rejected on that basis.

Art Unit: 2172

As per claims 11 and 26, Li substantially teaches a method as claimed, further comprising the step of initializing a descriptor for the hash table, said descriptor storing a reference to the hash table and parameters for the hash table (where, in the lexicon is stored in a bucket associated with the bucket address equal to the decimal number of the group, which is readable as descriptor storing a reference to the hash table and parameters for the hash table) (see figure 4B, cols. 7 and 8, lines 50-67 and 1-12);

wherein the step of identifying a hash table includes the step of identifying a descriptor indicating the hash table and a prime number (thus, the bucket addresses associated with the unverified string is stored the content and length of this list of pointers will depend on the number of groups selected to be hashed, which is readable as identifying a hash table includes the step of identifying a descriptor indicating the hash table and a prime number) (see col. 9, lines 18-21).

As per claims 12 and 27, Li substantially teaches a method as claimed, wherein the step of initializing a descriptor for the hash table includes the step of initializing a prime number for use in computing a hash value (thus, the bucket addresses associated with the unverified string is stored the content and length of this list of pointers will depend on the number of groups selected to be hashed, which is readable as wherein the step of initializing a descriptor for the hash table includes the step of initializing a prime number for use in computing a hash value) (see col. 9, lines 18-21).

Art Unit: 2172

As per claims 13 and 28, in addition to the discussion in claim 6, Li teaches a method as claimed, wherein the step of initializing a descriptor for the hash table includes the step of initializing a maximum number of slots for the hash table (where, the threshold may be set to limit the final list to the set number of candidates preferably ten candidates, which is readable as initializing a descriptor for the hash table includes the step of initializing a maximum number of slots for the hash table) (see col. 10, lines 4-10).

As per claims 14 and 29, the limitations of claims 14 and 29 are rejected in the analysis of claim 6 above, and these claims are rejected on that basis.

As per claims 15 and 30, in addition to the discussion in claims 1 and 6, Li does not explicitly indicate the step of searching the particular sequence of slots for a slot holding a key value matching the key, and if a slot having a key value matching the key is found in the particular sequence of slots, but is not at the beginning of said particular sequence of slots, then moving a relative position of the key value within the particular sequence of slots toward the beginning of the particular sequence of slots. However, Li implicitly shows the step of the determined whether all the entries of the lexicon have been processed, if not the method returns to step and the next lexicon entry is selected, the partitioning and hashing subroutine is run for each entry of the lexicon, the indexing or hashing is carried out for all the entries of the lexicon when the entire lexicon is processed many of the individual bucket addresses will be associated with varying numbers of the entries of the lexicon, all the forgoing steps are completed in advance of actual matching to any unverified string; which is readable as searching the particular

Art Unit: 2172

sequence of slots for a slot holding a key value matching the key, and if a slot having a key value matching the key is found in the particular sequence of slots, but is not at the beginning of said particular sequence of slots, then moving a relative position of the key value within the particular sequence of slots toward the beginning of the particular sequence of slots (see col. 8, lines 16-24). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Li with the step of a slot holding a key value matching the key, and if a slot having a key value matching the key is found in the particular sequence of slots, but is not at the beginning of said particular sequence of slots. This modification would allow Li to improve the accuracy and the reliability of the lexical cache, and provide a method and system for reducing the portion of a lexicon to be compared with unverified strings so that the remaining entries have a high likelihood of containing a match for the unverified string (see col. 4, lines 44-48).

6. Claims 5 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US Pat. No. 5,774,588) in view of Levine et al. (US Pat. No. 6,073,129).

As per claims 5 and 20, Li teaches all the subject matter of the claimed invention with the exception of an exact steps of generating a prefix based on the key. However, implicitly Levine shows step of the unrecognized prefixes and keywords are processed as comments; which is readable as generating a prefix based on the key (see col. 44, lines 19-20). Also, in column 43, lines 59 through 61, Levine teaches defines the area of relational database management system software to which the configuration parameter applies for SQL cache parameters, the prefix is

Art Unit: 2172

SQL-cache. Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Li with the teachings of Levine with the step of the generating a prefix based on the key. This modification would allow the teachings Li and Levine to provide a more efficient way of managing memory resources during the processing of information queries (see col. 2, lines 36-38).

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ahuja et al. US Patent Number 5,946,679 relates generally to searching of tables and specifically to route tables given a large field to match against as a search key.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CAR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CAR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2172

Conclusion

9. Any inquiry concerning this communication from examiner should be directed to Jean Bolte Fleurantin at (703) 308-6718. The examiner can normally be reached on Monday through Friday from 7:30 A.M. to 6:00 P.M.

If any attempt to reach the examiner by telephone is unsuccessful, the examiner's supervisor, Mrs. KIM VU can be reached at (703) 305-8449. The FAX phone numbers for the Group 2100 Customer Service Center are: *After Final* (703) 746-7238, *Official* (703) 746-7239, and *Non-Official* (703) 746-7240. NOTE: Documents transmitted by facsimile will be entered as official documents on the file wrapper unless clearly marked "*DRAFT*".

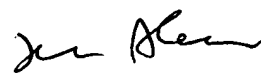
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 2100 Customer Service Center receptionist whose telephone numbers are (703) 306-5631, (703) 306-5632, (703) 306-5633.



Jean Bolte Fleurantin

November 14, 2001

JBF/



HOSAIN T. ALAM
PRIMARY EXAMINER